

विषय/ Subject: जीव विज्ञान / Biology (044)

General Instructions:

(i) All questions are compulsory.

(ii) The question paper has five sections and 33 questions.

(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.

(iv) There is no over all choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labelled diagrams should be drawn.

Q.No.	Questions SECTION-A	Marks																
1.	Match and find the correct option <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">a</td> <td>Plantae</td> <td style="width: 50px;">p</td> <td>Archaeobacteria</td> </tr> <tr> <td>b</td> <td>Fungi</td> <td>q</td> <td>Euglenoids</td> </tr> <tr> <td>c</td> <td>Protista</td> <td>r</td> <td>Phycomycetes</td> </tr> <tr> <td>d</td> <td>Monera</td> <td>s</td> <td>Algae</td> </tr> </table> <p>(A) a-s, b-r, c-q, d-p (B) a-r, b-q, c-p, d-s (C) a-q, b-p, c-s, d-r (D) a-p, b-s, c-r, d-q</p>	a	Plantae	p	Archaeobacteria	b	Fungi	q	Euglenoids	c	Protista	r	Phycomycetes	d	Monera	s	Algae	1
a	Plantae	p	Archaeobacteria															
b	Fungi	q	Euglenoids															
c	Protista	r	Phycomycetes															
d	Monera	s	Algae															
2	Which of the following is the correct name of wheat, derived by binomial nomenclature (A) <i>Triticum Vulgare</i> (B) <i>Triticum aestivum</i> (C) <i>Oriza sativa</i> (D) <i>Zea maize</i>	1																
3	Plasmogamy is fusion of (A) two haploid cells including their nuclei (B) two haploid cells without nuclear fusion (C) sperm and egg (D) sperm and two polar nuclei	1																
4	Malpighian tubules are (A) Excretory organs of insects (B) Excretory organs of annelids (C) Respiratory organs of insects (D) Respiratory organs of annelids	1																
5	In atmospheric air compared to alveolar air: (A) pO higher and pCO lower (B) Both pO and pCO are higher	1																

	(C) Both pO and pCO ₂ are lower (D) pO ₂ lower and pCO higher	
6	Vital Capacity is (A) TV+IRV+ERV(B) TV+ERV (C) RV+ERV (D) TV+IRV	1
7.	In Human beings the duration of Cardiac Cycle is (A) 0.08 seconds(B) 0.8 seconds(C) 0.5 seconds(D) 8.0 seconds	1
8	Diabetes insipidus can be cured by administration of (A) Insulin(B) Glucagon (C) ADH (D) Antihistamine	1
9	The most abundant enzyme in biosphere is- (A)Carbonic anhydrase (B) Nitrogenase (C) Rubisco (D) Invertase	1
10	“Bolting” in rosette plants is promoted by? (A) Auxin (B) Cytokinin’s (C) Gibberellic Acid.(D) Abscisic acid	1
11	Casparian strip is made up of (A) Lignin (B)Pectin (C)Suberin (D)Cellulose	1
12	Which of the following sugar is found in nucleic acid (A) Dextrose (B) Lactose (C) Fructose (D) Ribose	1
	Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true and R is not the correct explanation of A. C. A is true but R is false. D. A is False but R is true.	1
13	Assertion (A): Algae are classified under Kingdom Plantae in Whittaker's system. Reason (R): Algae are multicellular plants with chlorophyll.	1
14	Assertion (A): Photosynthetically C4 plants are less efficient than C3 plants. Reason (R) The operation of C4 pathway reduces the loss caused by photorespiration.	1
15	Assertion (A): Prokaryotic cells lack membrane-bound organelles. Reason (R): Prokaryotes have ribosomes, which are non-membrane-bound, but they lack structures like mitochondria or ER.	1
16	Assertion (A): During muscle contraction, the length of the A-band decreases. Reason (R): The A-band contains myosin filaments which do not change length, but the I-band shortens as actin slides in.	1

SECTION-B		
17	Differentiate open and closed circulatory system with an example for each. OR Mention the differences between Gram positive and Gram negative bacteria.	2
18	"All underground parts of a plant are not always root"- comment	2
19	Justify why Euglenoids are placed in the Kingdom Protista despite these plant-like and animal-like traits.	2
20	Vascular bundles are referred as open or closed. How do they differ from one another? Can it be used for classification of plants? OR Why it is stated as "Lichens are remarkable organisms that can survive in some of the most inhospitable and uninhabited places due to their unique symbiotic relationship" give your opinion	2
21	In human skeletal system the ribs are classified into three types – what criteria is followed also mention their numbers. OR Viruses are not placed in any of the five kingdoms of classification. a) Mention one living characteristic and one non-living characteristic of viruses. b) Explain why viruses cannot be classified under Kingdom Monera.	2
SECTION-C		
22	i. Name the pathway by which glucose is broken down in the cytoplasm. ii. Write the net gain of ATP and one end product formed during this process. iii. What happens to the end product in presence of Oxygen and in absence of Oxygen. iv. This pathway is also referred as EMP pathway, why?	3
23	During a field study, a biologist found an organism that is multicellular, eukaryotic, absorbs nutrients from dead organic matter, and has a cell wall made of chitin. a) Identify the kingdom to which this organism belongs. b) Explain two features that support its classification	3
24	Expand Rubisco. Mention its dual role and conditions required?	3
25	What are the major transport mechanisms for CO ₂ ? Explain	3
26	Differentiate between ammonotelism, ureotelism, and uricotelism. Give one example for each and state the advantage of uric acid excretion in reptiles over ammonotelic animals	3
27	Explain different types of plastids, their pigments and functions. OR Describe briefly the role of (a) auxins (b) gibberellins (c) abscisic acid	1+1+ .5+.5= 3 OR 1+1+1
28	A diabetic patient is advised to reduce the intake of certain foods in the diet. a) Name the biomolecule that should be limited.	3

- b) Identify the most common storage form of this biomolecule in humans.
c) Explain one reason why reducing its intake is helpful for a diabetic patient.

SECTION-D

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ABO Grouping

ABO grouping is based on the presence or absence of two surface antigens on the RBCs, viz. A and B. Antigens are chemicals which can induce immune response. The plasma also contains two natural antibodies. Antibodies are proteins produced in response to antigens. Importance of Blood Group: During blood transfusion, the donor blood needs to be carefully matched with the blood of a recipient. Transfusion of unmatched blood can lead to severe problems of clumping, i.e. destruction of RBC.

1+1+1
+1

Blood Groups and Donor Compatibility

Blood Groups	Antigen on RBC	Antibodies in Plasma	Donor's Group
A	A	Anti-B	A, O
B	B	Anti-A	B, O
AB	AB	Nil	AB, O
O	O	Anti-A, B	O

Q 1. Which blood group is universal blood donor?

- (A) A (B) B (C) AB (D) O

Q 2. Which blood group is universal recipient?

- (A) A (B) B (C) AB (D) O

Q 3. Blood grouping is based on

- (A) presence of antigen (B) absence of antigen
(C) presence or absence of antigen on RBC (D) none of the above

Q 4. Which blood group can develop antibody- A

- (A) A, AB (B) B, O (C) AB, O (D) O, A

OR

What is *erythroblastosis foetalis*?

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A biology student collected a flowering plant from a garden for study. On careful observation, the student noted the following features:

- The plant has a tap root system with lateral branches.
- Leaves are reticulate venation and arranged alternately on the stem.
- The flower is bisexual, actinomorphic, and pentamerous.
- The stem shows vascular bundles arranged in a ring, which are conjoint, collateral, and open.
- Presence of cambium is observed between xylem and phloem.

Based on the above information, answer the following questions:

- I. The type of root system observed in the plant indicates that it belongs to:
A. Monocotyledonae B. Dicotyledonae C. Gymnosperms D. Pteridophytes

II. The presence of cambium in vascular bundles suggests that the stem shows:

- A. No secondary growth
- B. Closed vascular bundles
- C. Secondary growth
- D. Scattered vascular bundles

III. Vascular bundles arranged in a ring are typically found in:

- A. Monocot stem
- B. Dicot stem
- C. Monocot root
- D. Leaf midrib

IV. A bisexual and actinomorphic flower means that the flower:

- A. Has only male reproductive parts
- B. Can be divided into two equal halves in one plane
- C. Has both male and female reproductive parts and is radially symmetrical
- D. Is incomplete and unisexual

OR

What is phyllotaxy?

SECTION-E

31

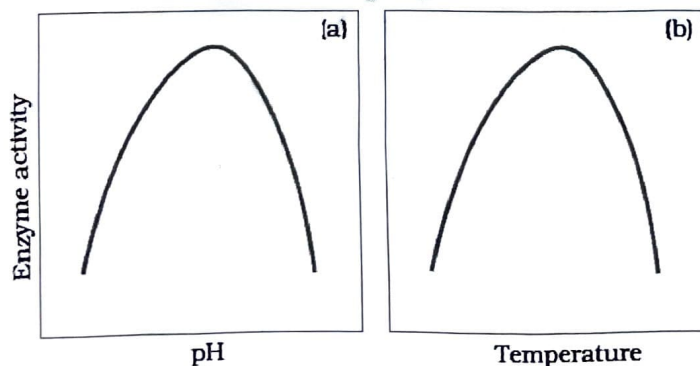
A somatic cell of a diploid organism has 10 picograms (pg) of DNA at the end of G1 phase.

1+2+2

- (a) Determine the DNA content (in pg) at the end of S phase and G2 phase, explaining your reasoning.
- (b) Explain when and why mitosis is essential in multicellular organisms, why meiosis is crucial?
- (c) what is crossing over? mention the stage of cell division where crossing over takes place.

OR

- a) What are enzymes?
- b) The enzymatic activity of trypsin was studied under various pH (Fig-a) and Temperature (Fig-b) and following two graphs were obtained. what can you conclude about the nature of enzyme activities.



- c) What are co-factors?

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With respect to the nervous system what do you understand by action potential? Explain how nerve impulse is transmitted from one neuron to another.

OR

Describe the process of CO₂ fixation by Hatch and Slack Pathway.

33	<p>You are Provide a technical term from the kingdom animalia- Define the terms, Identify the phylum and give one example each of the following.</p> <ol style="list-style-type: none">1. Haemocoel-2. Nematocytes-3. Flame cells -4. Parapodia-5. Radula - <p style="text-align: center;">OR</p> <p>a) Which one of the plant growth regulator would you use, if you are asked to:</p> <ol style="list-style-type: none">i) Induce rooting in a twigii) Quick ripening of a fruitiii) Delay in leaf senescenceiv) Induce immediate stomatal closure in leavesv) Increase length of a dwarf plant	3+1+2
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----- ALL THE BEST -----